

UNITED STATES MARINE CORPS
Logistics Operations School
Marine Corps Service Support School
PSC Box 20041
Camp Lejeune, North Carolina 28542-0041

LOC 1417

STUDENT OUTLINE

ENGINEER SUPPORT

LEARNING OBJECTIVES

1. Terminal Learning Objective: Given the requirement to provide general engineering support, commander's guidance, the concept of combat service support, and the references, coordinate general engineering support, to ensure engineering requirements are incorporated in the combat service support (CSS) plan. (0402.05.01)

2. Enabling Learning Objectives:

(1) Given the references, commander's guidance, the concept of combat service support (CSS), and a written test, identify the planning considerations for engineering assets, per the references. (0402.05.01c)

(a) Identify the functions of General Engineering.

(2) Given the references, commander's guidance, the concept of combat service support (CSS), a written test, identify the capabilities of Marine Air Ground Task Force (MAGTF) engineer units, per the references. (0402.05.01a)

(a) Identify the mission of Combat Engineer Bn.

(b) Identify the mission of Marine Wing Support Squadron.

(c) Identify the mission of Engineer Support Bn.

(d) Identify the mission of Transportation Support Bn.

OUTLINE

1. ENGINEER SUPPORT CONCEPTS

a. Engineer support is nearly always situationally dependent on the size of the supported force, its mission, the scheme of maneuver, and the terrain. This requires extensive engineer intelligence derived from general collection assets, topographic units, and engineer reconnaissance.

c. Functions of General Engineering:

(1) Engineer Reconnaissance. Collects data that provides engineers within a MAGTF information on terrain, hydrographics, meteorological, and infrastructure (e.g., built-up areas, transportation networks, utilities, existing natural or man-made obstacles) necessary to support the commanders with their planning for ongoing or future operations.

(2) Horizontal and vertical construction. The MAGTF may have extensive requirements for expeditionary horizontal and vertical construction in support of sustained operations ashore. Construction is normally of an initial or temporary standard but can develop into complex construction projects, i.e., the construction of multistory structures or develop paved road networks when assisted by the Naval Construction Force.

(3) Facilities Maintenance.

(4) Demolition and obstacle removal. Combat engineers and Explosive Ordnance Disposal (EOD) Marines are capable of executing demolition work of a constructive or destructive nature. Demolition missions requiring the use of formulas or calculated quantities of explosives with specific placement to produce the desired effect are normally performed by engineers.

(4) Explosive ordnance disposal. EOD assets to support operations in the area of operations (AO) are normally found with the support engineer and wing engineer units, i.e., MSSG, ESB (in the FSSG), and MWSS (in the MAW). The operations typically supported by EOD units include:

(a) Clearing ordnance.

(b) Rendering ordnance safe.

(c) Identifying, collecting, evaluating, and exploiting foreign ordnance.

2. PLANNING CONSIDERATIONS: Whether employed in a combat support or combat service support role, the engineer planner must focus on the organization, management, and execution of engineer support operations. Certain key factors influence the planning and execution of engineer activities. Many operations require special training, techniques, tactics, or material support. Terrain and weather conditions are critical operation and planning factors. The most common of these conditions are desert operations, jungle operations, mountain operations, cold weather operations, combat in built up areas, assault of fortified positions, and airlanded operations. The following are practical considerations:

a. Heavy Equipment. Most construction equipment is heavy and slow. It offers little protection for the operator. Though able to negotiate rough terrain, its speed is such that it cannot keep up with the supported maneuver forces and must be transported by other assets.

b. Transportation. Engineer units do not have enough transportation assets to move themselves.

c. Construction Materials. Many CSS tasks require large amounts of Class IV (construction material). Time, manpower, equipment, and fuel to assemble and use these supplies are often significant. Shipping and storage space are also a serious concern.

d. Supply, Maintenance, and Ordnance Support. Supply, maintenance, and ordnance support for engineer operations is extensive. Engineer units have many low-density items of equipment requiring special maintenance to keep them operational.

e. Utilities Support. Water purification, fuel distribution, and power generating equipment require significant motor transport, Material Handling Equipment, manpower, and fuel to begin and continue operations. Utilities installations also generate large amounts of heat and noise.

3. SPECIFIC ENGINEER TASKS.

a. Utilities Support. Engineer units provide utilities support to the MAGTF.

(1) Water Purification. The MAGTF's general requirement is to initiate water production from any source. Production and limited storage of water is a supply function performed by engineers. Distribution is primarily by surface means provided by the Transportation Support Bn (TSBn). Engineers in both the division and wing have limited water production capabilities.

(2) Mobile Electric Power Equipment Support. Engineer units provide mobile electric power generators to units not authorized generators as part of their mission-essential equipment. Individuals possessing an electrician's MOS accomplish the actual planning and installation of mobile electric power systems. The division, wing, and FSSG are all capable of providing some level of mobile electric power.

(3) Field Sanitation and Hygiene. Hygienic services include a bath and laundry capability. Engineer units have the necessary skill and equipment to provide these services to the MAGTF. The capacity for production of potable water relates closely to hygienic services, since hygiene services all utilize tremendous quantities of potable water.

b. Bulk Fuel Support. Engineer units install, operate, and maintain bulk fuel handling systems. Delivery to consumers, other than on-site direct dispensing, IS NOT an engineer responsibility. For extensive fuel delivery requirements, the TSBn, FSSG, normally provides support. Increasing requirements for fuel dictate early installation of the Amphibious Assault Fuel System (AAFS), Tactical Airfield Fuel Dispensing System (TAFDS), Helicopter Expedient Refueling System (HERS) and/or other like systems.

c. Capabilities. The following capabilities are resident, to varying degrees, in every engineer unit: Engineer reconnaissance, obstacle breaching, obstacle installation/ construction, specialized demolitions, assistance with field fortifications, beach preparation, HLZ construction, forward operating base construction, technical assistance, standard and nonstandard bridge construction, drafting and surveying, general engineering, employment as infantry, water reconnaissance and purification, mobile

electric power equipment support, field sanitation and hygiene services, bulk fuel support.

4. ORGANIZATION OF MARINE CORPS ENGINEER UNITS (OPERATING FORCES):

There may be as many as four Naval Service Engineer units in the MAGTF. Three are permanent Marine Corps organizations and one U.S. Navy organization, in addition, TSBn has engineer assets that assist the MEF.

a. DIVISION. Combat Engineer Battalion (CEB)

(1) Mission. To enhance the mobility, countermobility, and survivability of the Marine Division through combat and limited general engineering support.

(2) Organization

(a) Headquarters & Service Company. Provides command, control and administrative support for the battalion. This includes the provision of supply, food services, communications, chaplain services and medical support.

(b) Combat Engineer Company. Enhances the mobility, countermobility and survivability of the supporting ground combat element with combat engineering.

(c) Engineer Support Company. Provides personnel and equipment or task-organized heavy equipment, utilities, maintenance, and motor transport support to other elements of the battalion.

(3) Concept of Employment. A CEBn is organized to provide one combat engineer company for each infantry regiment and its tasked elements and still maintain the flexibility to provide required augmentation to the combat engineer companies in the forward areas. Normally, a reinforced combat engineer company provides direct support to an infantry regiment or Regimental Landing Team (RLT) and a reinforced combat engineer platoon supports an infantry battalion or Battalion Landing Team (BLT).

b. MARINE AIRCRAFT WING. Marine Wing Support Squadron/fixed wing (MWSS/FW), rotary wing (MWSS/RW).

(1) Mission. Provide essential Aviation Ground Support

(AGS) to a designated fixed/rotary-wing component of a Marine aviation combat element (ACE) and supporting or attached elements of the Marine air control group.

(a) S-3 (Operations): The engineer operations division of the S-3 provides the full range of general engineering support (less fuel) to designated components of the ACE. Engineers located in the airfield operations division receive, store, and dispense aviation and ground fuels from various types of expeditionary fuel systems. The engineer operations division is capable of executing the following:

1. Providing engineer reconnaissance/survey;
2. Repairing, improving, and maintaining existing road nets within the ACE AOR;
3. Constructing and maintaining expedient roads;
4. Constructing, maintaining, and improving vertical/short takeoff and landing sites;
5. Constructing and maintaining mission-essential base camp requirements;
6. Providing essential utilities support.

(2) Organization. The MWSS consists of a squadron headquarters, executive staff (S-1 through S-4), military police and flight line security department, and equipment maintenance department. The S-3 holds staff cognizance over internal airfield communications, airfield operations division, motor transport operations division, and engineer operations division. The S-4 holds staff cognizance over food services, medical, supply, maintenance, and fiscal divisions. The engineer operations division of the MWSS organizes to provide limited combat and general engineering support to designated components of the ACE. Engineers located in the airfield operations division receive, store, and dispense aviation and ground fuels from various types of expeditionary fuel systems. The engineer operations division is capable of:

(a) Providing engineer reconnaissance and survey.

(b) Repairing, improving, and maintaining existing road networks for the ACE.

(c) Constructing and maintaining expedient roads.

(d) Constructing, maintaining, and improving vertical or short take off and landing sites.

(e) Constructing and maintaining mission essential base camp requirements (temporary bunkers, aircraft revetments, and strongbacks).

(3) Concept of Employment. The MWSS provides all AGS, including engineering, to designated components of the ACE and simplifies command relationships by providing a single commander for all matters pertaining to AGS.

c. FORCE SERVICE SUPPORT GROUP

(1) Engineer Support Battalion

(a) Mission. To provide combat engineering and limited general engineering, bulk liquid, and utility support to the MAGTF. The ESBn performs the following tasks:

1. Combat engineering support
2. Standard and nonstandard bridging
3. EOD support
4. Handling, storing, and dispensing bulk fuel Class III and Class III[A]
5. Tactical utility support
6. Expeditionary vertical and horizontal

(b) Organization

1. Headquarters & Service Company. Provides command and control, administration, and command support functions for the ESBn. The H&S Company also provides EOD support to the MAGTF.

2. Engineer Support Company. Provides direct maintenance support for specified equipment organic to the battalion, direct transportation and services support to the battalion, and general support/reinforcing augmentation to the engineer companies of the battalion. The Engineer Support Company is responsible for maintaining and providing:

- a. Engineer equipment for all units of the battalion
- b. Utility support throughout the MAGTF

3. Engineer Company. Provides combat engineering and limited general engineering support to the MAGTF.

4. Bridge Company. Provides standard bridging and ferrying support to enhance the mobility of the MAGTF.

5. Bulk Fuel Company. the mission of the Bulk Fuel Company is to receipt, store, and provide limited distribution of bulk fuel (Class III and Class III [A]) to MAGTF elements.

(c) Concept of Employment. The ESBn provides combat and limited general engineering in general support of the MAGTF. The battalion can provide separate units to support specific requirements; i.e., a combat engineer company to reinforce the CEB or MWSG. The battalion regains operational control of all of its assets when the FSSG is established ashore. Operating under centralized control, the battalion gives depth to the overall engineering effort by providing the GCE and ACE engineer support that exceeds their organic capabilities. The battalion works in concert with the Naval Construction Force (NCF) to provide comprehensive engineer support to the MAGTF.

(1) Transportation Support Battalion

(a) Mission. Provide motor transport, air delivery, and landing support for the MEF. Landing Support provides for ship-to-shore movement during amphibious, maritime prepositioning force (MPF) operations, and subsequent terminal operations to permit throughput of supplies, equipment, and personnel. Motor transport support includes medium- and heavy-lift transportation support.

(b) Organization

1. Headquarters & Service Company.

2. Support Company. Provides materials handling equipment (MHE) and container handling support.

3. Beach and Terminal Operations Company.

4. Landing Support Company.

5. General Support Motor Transport Company.

6. Direct Support Motor Transport Company.

d. NAVAL CONSTRUCTION FORCE

(1) Mission. Provide responsive military construction support to Navy, Marine Corps, and other forces in military operations; to construct and maintain base facilities; to repair battle damaged facilities and to conduct limited defensive operations as required by the circumstances of the deployment situation.

(2) Organization. Naval Mobile Construction Battalion (NMCBn) consists of a Headquarters Company, Equipment Company, Shops and Utilities Company, and a General Construction Company. The NMCBn is the backbone of the NCF.

5. TM-11275-15/3C

a. Section 1. Provides the introduction of the manual, which includes a description of the general arrangement and format used within the text. It explains various methods for locating equipment data, and also a list of abbreviations used within the text.

b. Section 2. Provides equipment description sheets.

c. Table A-1. Provides engineer equipment listed by functional category.

d. Table B-1. Provides engineer equipment listed by TAM number sequence.

e. Table C-1. Provides engineer equipment not shown in section II.

f. Table D-1. Provides an English/metric conversion chart.

6. FUEL DISPENSING SYSTEMS: The major systems for handling large quantities of bulk fuel in an amphibious operation consist of:

a. Ship-to-Shore Fuel Transfer Lines. Naval elements install and operate the Amphibious Assault Bulk Fuel System (AABFS) establishing the link between fuel stored in

amphibious shipping and the Amphibious Assault Fuel System at a maximum rate of 600 gallons per minute.

b. Amphibious Assault Fuel System (AAFS). The system is installed from the "high-water" mark on the beach and operated by the bulk fuel company of the Engineer Support Battalion, FSSG. The current allowance of AAFSs for the bulk fuel company is 8. Each AAFS is capable of delivering bulk fuel by hose for a distance of about 3 miles. In the event that a distance greater than 3 miles is required of the AAFS in transferring fuel inland, components from two or more systems can be installed in series to provide the greater distance, but when this is done, overall flexibility is reduced. The maximum capability of each AAFS is as follows:

(1) Each AAFS has five tank farm assemblies with a storage capacity of 120,000 gallons for each tank farm, stored in six 20,000 gallon fabric tanks: a total storage capacity of 600,000 gallons for each AAFS.

(2) An additional 120,000 gallons may be stored in the fabric tanks located at the booster stations.

c. Tactical Airfield Fuel Dispensing System (TAFDS). The expeditionary storage and dispensing system for supporting class III (A) requirements at tactical airfields. It is composed of entirely compatible components to those of AAFS. Except for additional dispensing equipment, it is similar to the tank farm assembly of the AAFS. The optimum CSS situation is achieved under conditions wherein the TAFDS can be filled by direct connection to an AAFS. In cases where an airfield is located too far from the beach to be supported directly by AAFS fuel transfer, the TAFDS can receive fuel for storage from whatever mobile POL transportation system is provided. TAFDS capabilities are as follows:

(1) 20 TAFDS authorized per MWSG.

(2) Each TAFDS has the capability to store 120,000 gallons of fuel in six 20,000 gallon fabric tanks.

d. Helicopter Expeditionary Refueling System (HERS). An air-transportable fuel dispensing system. It consists of eighteen 500-gallon fabric drums and associated pumps, hoses, filters, etc. The system was originally designed for refueling helicopters at remote locations. Components of the

system (tanks, pumps, etc.) can also be used to refuel ground equipment. There are 18 HERS per MWSS and 56 of the 500-gallon fabric fuel tanks in bulk fuel company.

e. Other means of dispensing fuel. M970 tankers resemble a civilian tractor-trailer. They hold 5000 gallons of fuel. They also have a limited ability to dispense fuel. LVS sixcons are 900-gallon tanks, each within a steel frame. There is also a pump module within a similar steel frame. The LVS was designed to carry six steel frames (modules), three on a bottom layer with three others on a top layer. For safety reasons, configurations are limited to three fuel modules on the bottom layer with a single pump module on top. The added weight of fuel modules on the top layer was causing LVSS to tip over. There is also the capability to conduct rapid ground refueling (RGR). This is where a C-130 contains a large fuel bladder and dispensing hoses. The C-130 lands, unrolls the dispensing hoses and pumps fuel to whatever vehicles require it.

REFERENCES:

1. MCWP 4-1, Logistics Operations
2. MCWP 3-17, Engineering Operations
3. MCRP 5-12D, Organization of Marine Corps Forces
4. TM 11275-15/3C, Principle Technical Characteristics of
Marine Corps Engineer Equipment